Effect of rainfall on the reliability of an infinite slope

Abstract:
Rainfall is one of the most common factors triggering landslides, since infiltration of water into the soil has a significant impact on pore water pressure buildup that affects slope stability. In this study, the influence of the wetting front development on the reliability of an infinite slope is analyzed. The failure condition of the slope is expressed in terms of the factor of safety. Rainfall infiltration is simulated by a time-dependent model, based on the Green and Ampt assumptions. The vertical variability of the saturated hydraulic conductivity and soil strength parameters are modeled as random fields. The reliability of the slope is evaluated by Monte Carlo simulation. A numerical example demonstrates the influence of the vertical variability on the analysis results.
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